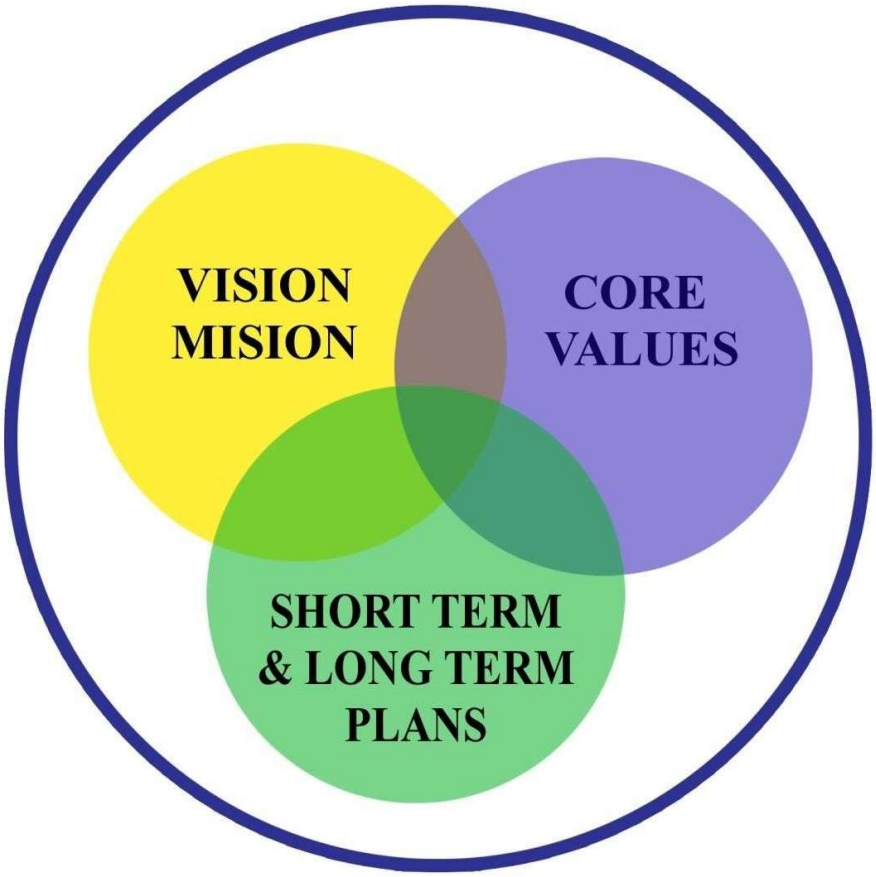
ST.ANN'SCOLLEGEFORWOMEN,

MALKAPURAM,VISAKHAPATNAM-530011

6.2.1 TheinstitutionalStrategic/Perspectiveplaniseffectivelydeployed

Document1: **StrategicPlan**



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Malkapuram, Visakhapatnam

VISION

We envisage the empowerment of young girls of today through value based holistic education to champion the cause of justice, peace, love, truth, and live in harmony with the nature and are ever open to future growth.

MISSION

St. Ann's College for Women through value based education empower the young girls who are Intellectually competent, spiritually mature, morally upright, psychologically integrated, physically healthy and socially acceptable who live in harmony with nature and God.

CORE VALUES

- **Sensitivity**
- **Alertness**
- **Service**
- **God Consciousness**
- **Altruism / Compassion**
- **Universal brotherhood**
- **Religious Tolerance**
- **Emotional Maturity**
- **Intellectual Excellence**
- **Creative/ Critical Thinking**
- **Moral social responsibility**
- **Eco-friendliness**
- **Dignity of labour**
- **Ethical leadership**

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Strategic PlanforAdministration

Short TermPlans

- Crashcourses
- CertificateCourses
- AdolescentEducation
- PeerleadershipTrainingProgramme
- Regularisationofstaff
- OrientationforStaff
- StaffDevelopmentalProgrammes
- Academic–Invention/Selectionofnewgroup/Combination
- AlternationforDegree
- PersonalityDevelopmentofStudent
- Freehealthmedicalcheckuptostudents
- Extensionofservicebythestudentsto theneedy
- Empowermentofyounggirls

LongTermPlans

- Extensionofbuilding
- Internships
- Student science projects
- Student Paper Publication
- Small Entrepreneurships
- Institutional Innovations and Incubations
- Digitalandcomputerizedlibrary(LibraryAutomation)
- StartingPGCourses
- GettingAutonomousStatus
- EnhancingthecommunicationSkillsoftheStudents
- CampusPlacement
- Introductionofnewcourses
- Wellestablishedcounsellingcellwithtrainedcounsellor
- APSSDCProgramme

- CoachingforCompetitiveexam
- StrengtheningAluminae
- ModificationOfCampusInterior

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Document2: InstitutelevelObjectives

InstituteLevelObjectives

- **HolisticEducation**:Oureducationalprogrammeaimsattheintegrateddevelopmentof the human person. As a catholic institution our attempt is to lead our students tovarious avenues of knowledge and help them to think creatively. We focus ourattention to provide a sound, intellectual, spiritual, psychological, physical, moral,social,and culturalformation.

- **Academic Excellence**: In addition to textual knowledge, our educational institutionsinculcate in the student's intellectual curiosity, habits of systematic work, personalquestforknowledge,criticalandcreativethinkingandanaptitudeforresearch.

- **Spiritual Education:** The Spiritual Education programmes are geared towardsfostering in our students a high degree of awareness of God, self, others and theuniverse, religious tolerance, the capacity to face challenges and transcend suffering,thequalityofbeinginspiredbyvisionandvalues,andasenseofcommunionwith allliving beings.

- **Physical development:** Our curriculum includes a well- developed programme ofphysicaldevelopment,sportsandgames,yogaandotheroutdoorexercisewhichhelpsto develop a healthy body, self-discipline, an attitude of grateful acceptance of one'slifeasagiftofGod.Italsopromotesthespirit ofteamwork.

- **Creative leadership:** Students are trained in leadership qualities to be inspiringpersons with courage and inner strength and to take up responsibilities for the welfareof all.

- **Faith formation:** As directed by the founder, our institution has responsibility tomakevaluesofJesuscomealiveinthelifeofChristian/Catholicstudents.Withthisinmind wefacilitateBiblestudyand Catechismclasses forCatholicstudents.

- **Value Education:** We prepare future citizens who would think and work for themotherlandwiththespiritofdedication,irrespectiveoftheirdifferenceincaste,creedor religion. A balanced sense of values is fostered to prepare the students for differentprofessions andfor ameaningfullife.

- **Universal Brotherhood:** The students are helped to be aware and accept that all arechildrenofthesameGod,theFatherwhoistheauthorandsourceoflifeandcreation.Our educational programme enables the students to respect all religions. It createsawareness that the people of different religions are co-pilgrims guiding one anothertowards theoneimmanentandtranscendent God.

- **Dignity of Labour**: Our educational programme fosters a healthy attitude towardsmanual labour and hard work. The staff and students take responsibility in keeping theschoolandsurroundings clean.Everyemployeeistreated withdignityandlove.

- **Social Awareness**: The students are trained to have respect for the basic humandignity and human rights as well as deep compassion for the poor and downtrodden.Wemakethemaware oftheevilsexistinginthesocietyand instilin themasenseofjusticeto establishajust society.

- **Eco-Friendliness**:LoveandrespectforMotherEarthisanimportantaspectofoureducational endeavor. We help the children grow in harmony with nature. Weencourage them to participate in beautifying the environment and preserving therichness of Mother Earth.

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Document3: **DepartmentalLevelObjectives**

DepartmentLevelObjectives

LEARNINGOBJECTIVESOFCHEMISTRY

The Chemistry Curriculum is a program of study consisting of classroom instruction& Laboratory activities that are designed to give students both Theoretical and hands-onknowledgeof chemistry&theself-confidence& competenceto

- Understand the relevance of fundamental principles and theories of chemistry to life,natureand society
- Applyprinciplesofchemicalsafetybothinlaboratorysettings&otherenvironments
- Keeplegible&completeexperimentalrecord
- Synthesize&characterizeorganic&inorganiccompounds
- Usethecomputerasatoolforlearning&applyingchemicalprinciples
- Apply the principles of the four sub-fields of chemistry, namely : chemical analysis &instrumental methods of analysis, inorganic chemistry, organic chemistry and physicalchemistry

LEARNINGOBJECTIVESOFCOMMERCE

1) The main objective of commerce is to provide knowledge about the commerce and toprepare the student for vocational competency including training and development ofskill
2) Commerce education helps the students to draw conclusions about the financialposition of the organization
3) Ithelpstoimparttheexperienceofthebusinessworldinallitsmanifestations
4) Itequipsstudentswithanumberofspecializedskillsthathelpthemexcelindifferentfunctional areasof trade,industryandcommerce
5) Fighting challenges in commerce education by promoting its importance in businessand finance
6) Toidentifyingfuturetrendsincommerceeducation

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LEARNINGOBJECTIVESOFHISTORY

Teachingofhistoryenablesthepupilstoachievevariousinstructionalobjectivesinanhierarchical manner.Theseobjectivesare

1) FactsIdentification
2) Logicalandcriticalthinking
3) Globalthinking
4) Objectiveattitude
5) Interestonarchives
6) Practicalskills

LEARNINGOBJECTIVESOFCOMPUTERSCIENCE

In general, Computer Science has 7 objectives. These are known as 4 pillars ofComputerScience are:

1. SoftwareEngineering
2. DataStructureandalgorithms.
3. OperatingSystem(OS).
4. DataBaseManagementSystem(DBMS).
5. Web Interface Technology
6. ObjectOrientedProgrammingSystem(OOPs).
7. SystemDesign.

ComputerSciencehasthefollowinglearningobjectivesatundergraduatelevel.

1. Demonstratebreadthanddepthofknowledgeinthedisciplineof ComputerScience.

2. Analyseacomplexcomputingproblemtoapplyprinciplesofcomputing.

3. Design, implement and evaluate a computing based solution to meet a given set ofcomputing requirements in the context of programsdiscipline.

4. DemonstratecomprehensionofmodernsoftwareEngineeringprinciples.

5. Demonstrate proficiency in the analysis of complex problems and the synthesis ofsolutions tothoseproblems.

6. Demonstrateproficiencyinproblemsolvingtechniquesusingthecomputer.

7. Demonstrate proficiency in at least two high level programming languages and twooperatingsystems.

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LEARNINGOBJECTIVESOFDEGREEZOOLOGY

TheLearningObjectivesofZoologycouldbeinconsonancewiththeBloom'sTaxonomy,which includes–

1. Remember(Lowerorder)

2. Understand(LowerOrder)

3. Apply(LowerOrder)

4. Analyse(HigherOrder)

5. Evaluate&ProblemSolving(HigherOrder)

6. Create(HigherOrder)

Thesubject,Zoologyhasthefollowinglearningobjectivesatundergraduatelevel.

1. Critical thinking: The student should be able to understand and utilize the principles ofscientific enquiry, think analytically, clearly and evaluate critically while solving problemsand makingdecisionsduringbiologicalstudy.

2. Effective communication: Able to formally communicate Scientific ideas andinvestigationsofthebiologydisciplinetoothersusingbothoralandwrittencommunicationskills.

3. Socialinteraction: Abletodevelopindividualbehaviorandinfluencesocietyandsocialstructure.

4. Effective citizenship: Able to work with a sense of responsibility towards socialawareness andfollowthe ethicalstandardsinthe society.

5. Ethics: Abilitytodemonstrateanddiscussethicalconductinscientificactivities.

6. Environment and Sustainability: Able to understand the impact of biological science insocietal and environmental contexts and demonstrate the knowledge for sustainabledevelopment.

7. Self-directed and life-long learning: Able to recognize the need of life-long learning andengagein research and self-education.

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LEARNINGOBJECTIVESOFHINDI

OBJECTIVES

1) The main objective of incorporating Hindi as a subject to create interest in thelanguageandliterature
2) Tomasterartofcommunication
3) Hindi is the national language of India, so students should be motivated to study thislanguage
4) Hindiestablishethicalvaluesinstudents,itleadsthemtowardsrightdirection
5) Literatureisthemirrorofownsociety
6) Itwillreflecttherichdiverseculturefournation
7) Inclusionofgrammar willenablestudentstoperfecttheirwritingskills,ithelpsthemintheircareer

LEARNINGOBJECTIVESOFMICROBIOLOGY

Microbiologygives theknowledge and understanding of the core concepts in thedisciplineof Microbiology.

CoreObjectives:

i. Studentswilllearnhowmicroorganismsareusedtostudybasicbiology,genetics andmetabolism.
ii. Studentsarecapabletoidentifythemicroorganismsthatcausethedisease,andmethodologies areused in diseasetreatmentandprevention.
iii. Studentswilllearnaboutthevitalroleofmicroorganismsinbiotechnology,fermentation,medicine andotherindustries.
iv. Studentsareabletoknowaboutthemicrobialinteractionwithenvironmentincludingelemental cycles-carbon,nitrogen andbiodegradationetc.
v. Studentswilllearnhowimmunecellsandimmuneorganswillfightagainsttheinfection.
vi. Therearesomefundamentalskills,whichwouldbeusefultofunctioneffectivelywithinthefieldof Microbiology.

Scientific Inquiry: Discuss science and scientific methodology as a way of observations,developing newhypothesisandtodesignexecuteexperiments.
Laboratory: Aseptic and pure culture techniques, preparation of samples for microscopy,appropriatemethodstoidentifymicroorganisms,estimatethenumberofmicroorganismsinasample anduse commonlabequipment.
Data analysis:Able to collect, record, and analysing the data. Formatting the data intotables,graphsandcharts.

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LEARNINGOBJECTIVESOFPUBLICADMINISTRATION

In general , Public Administration has 4 objectives. These are known as 4 pillars ofPublicAdministration.Theyare

1] Economy

2] Efficiency

3] Effectiveness

4] Socialequity

But, as a subject, Public Administration has the following learning objectives atundergraduatelevel.

1] Thestudentsshouldbeablelead&managepublicgovernance.

2] Thestudentsshouldparticipatein&contributetothepolicyprocess.

3] The students should be able to analyse& synthesize different Administrative theories.

4]Thecritical &creativethinkingshouldbe inculcated among students.

5] The life skills like problem solving, decision making & communication should bepromoted.

6] Thestudentsunderstandingaboutdifferentadministrativesystemsshouldbeincreased.

7] To make the students to understand recent trends in Administration like e-governance,newpublic management&public-privatepartnershipetc…

8] Tomakethestudentstoutilizetheknowledgeofpublic Administrationasatoolofdevelopment.

9] To promote the students abilities regarding proper use of

resources10]TopromoteDemocraticvalues &lifestyleamong youth.

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LEARNINGOBJECTIVESOFMATHEMATICS

Themissionofthemathematicsdepartmentistoprovideanenvironmentwherestudentscanbecome mathematical thinkers, competent users and problem solvers of mathematics andmathematical applications and enable them to become lifelong learners and function asproductivecitizens.

OBJECTIVESOFOURDEPARTMENT

1. Toofferasetofcorecoursesinmathematicsaimedatdevelopingthestudent'sintellec tual curiosity, creativeabilityand habitofindependentstudy.
2. To provide the opportunity for the student to participate in research projects, summertraining,seminars,workexperiences,participationincongresses,exchangeofstude ntsand creativeprojects.
3. To promote ethics in the profession in the courses or in other academic activities, suchas: conferences,orientationsandseminars.
4. Totrainprofessionalsintheeducationofmathematicsatalllevels.
5. Toprovideopportunitiesforthestudenttoparticipateincollaborativeworkanddevel op their leadership andgroup workskills.
6. Tofacilitateandpromotesecondconcentrationinmathematicsforstudentsofotherdiscipl ines.
7. To provide mentoring through postgraduate students and teachers to individualize andenrichthe student'smathematical experience.
8. Toprovidecourses,mentoring,participationinresearchprojectsandotheractivitiesforstu dentsinterested in pursuinggraduatestudiesin mathematics.
9. Toprovidetheopportunityforstudentstoconcentrateinmathematicstostudyrelatedfields.

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RESEARCHARTICLE

ComparativeEvaluationofWheatProteinExtractfromNaturalandCommercial Wheat Flour

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ABSTRACT

Wheatandwheatproductplayanimportantroleforfoodindustries, comprisingamongallothercerealproducts wheat occupythefirst positiondueto its nutritional values. There was hugescientific challengeof today to develop a easily biodegradable wheat protein.

The use of excess of proteins, lipids andpolysaccharides in

commercially available wheat flour have thus been disturbing the human healthwhich would bring the acute health issues. The present study is aimed to check the biodegradability ofwheat proteinby using *E.coli*as these bacterial cells are beneficial and symbiotic in their nature ofdigestion. The wheat protein content varies from 114.4gm/500gm - 34.5gm/500gm. The highest wheatprotein extract was observed in commercially available wheat flour when compared with naturallygrinded wheat flour. The wheat protein Gluten was insoluble in water, alkaline and also acid due to itspolymericnature.Thetestforpolymerpresenceshowednegativeresults.

Keywords: Wheatprotein,Glutein,biodegradability,*E.coli*andPolymer

INTRODUCTION

Wheat flour proteins, when mixed with water, form visco- elastic mixtures used for bread and baked goods that playa major role in human diets. India expects a fifth record wheat crop in a row, 87.5 million metric tons, on higherplantedareaandoptimalgrowingconditionsinmajorgrowingareasintheye ar2012[6].Wheatandwheatproductplay an important role for bakery food, comprising more than half of the daily energy consumption worldwide,amongallwheatflour occupythefirstposition duetoitsnutritionalvalues.Proteinisconsideredthemostimportantnutrient for humans and animals, as manifested by the origin of its name, from the Greek proteios for primary,wheat isuniqueamongcerealsandotherproteinaceousplantinthemilledproduct,flouralo neiscapableofformingadoughduetoitsglutencontent,the doughretainsthegas evolved duringfermentation[4].

Qualitative ratio of wheat proteins fraction provided an important information to determine the food value [3]. Thegluten proteins consist of monomeric gliadins and polymeric glutenin's. Glutenin's and gliadins are recognized asthe major wheat storage proteins, constituting about 75–85% of the total grain proteins with a ratio of about 1:1 incommon or bread wheat [1]. The main types of glutenin proteins, the high-molecular-weight glutenin subunits(HMW-GS) of 66-88 kDa and the low-molecular-weight glutenin subunits (LMW-GS) of 32-45 kDa, are linked intopolymers that range in size from about 150 kDa to over 1,500 kDa [2]. MostCeliac Disease (CeD)patients agree thatsuchadietwouldbemuchmoresustainable,whiletheneededstrictlyglutenfree diet(lessthan20ppmofgluteninall foods, i.e., lessthan 20 mg/kg)is agreat challenge ineverydaylife[7]*E. coli* iscommonlyfoundinthe largeintestineof humansandotherwarm-bloodedanimals.Thesestrainscanbecommensal,existinginasymbioticstateprov iding resistance against pathogenic organisms, or be pathogenic and cause diseases of intestinal and extra-intestinalsites [5].

MATERIALANDMETHODS

Separationofwheatprotein

500gms of wheat grains were taken, grinded (natural) and commercial wheat flour of 500gms were used to preparewheat dough. Separation of wheat protein gluten from wheat dough by washing under a stream of running water tilltransparent appearance. Water soluble starch has been washed, where elastic mass like insoluble protein wasseparatedandweigheditimmediately.

Quantitativeproteintest

Preliminary quantitativetestwas doneby usingNinhydrinsolutiontoknowthepresenceofproteinfor bothwheatproteinextracts.

Solubilitytest

Seriesof testtubesweretakenand0.5gmsofwheatproteinwasaddedtoeachtesttube.Thesetesttubeweretreatedwithwater,ConcentratedHcl,Base(Na_2Co_3)and99%ethylalcoholtoknowitsrequiredtimeperiodofsolubility.

Biodegradabilitytest

0.5gmsoffreshlyextractedwheat proteinglutenofboththeflourswasaddedto50mlofnutrient brothwith*E.coli* cultureseparatelyandincubatedat37°Cfor24hours.Testwas repeatedonplateswithlawnof*E.coli*.

Polystyrenetest

Both natural and artificial wheat protein have submitted for polystyrene test by using Acrylonitrile Butadiene-Styrene

RESULTS

Separationofwheatprotein

The amount of wheat protein has been extracted from 500gms natural refined wheat flour was 38.4gms where as111.4gmswasextractedfromcommerciallywheatflourasshowninFig:1&2

Quantitativeproteintest

Boththe wheatproteinextractsshowedpurple colouraftertreatingwithninhydrinsolutionwhichwasthe one oftheconfirmativetestforpresenceof proteinintheextractasshownin Fig:3

Solubilitytest

The extract of naturally refined wheat flour was easily soluble in Conc. Hcl with in 2hours whereas the extract ofcommercially available wheat flour was not solubilised with Conc. Hcl. Both the extracts of wheat protein wasinsoluble in the water, Base Na_2co_3 and 99% ethyl alcohol as shown in the Figure:4 Fig:3-Positive Ninhydrin testFig:4-Solubilitytest

Biodegradabilitytest

0.5gms of natural wheat protein extract was degraded by the *E.coli*bacteria with in 8days, where it takes about23daysfordegradationcommercialwheatproteinby*E.coli*bacteria cellsasshowninFig:5a,5bFig:5aBiodegradationof commercialwheatproteinFig:5bNaturalwheatproteinextract

Polystyrenetest

Boththeextractsdoesn'tshowed anyreddishcolourwhich wasthe positive indicationforthe presence ofpolystyreneinthemassiveextractofwheatprotein.Bytheobservationit

DISCUSSIONANDCONCLUSION

Wheat and wheat product play an important role for bakery food, comprising more than half of the daily energyconsumption worldwide, among all wheat flour occupy the first position due to its nutritional values. The maintypes of glutenin proteins, the high-molecular-weight glutenin subunits (HMW-GS)

of 66-88 kDa and the low-molecular-weightgluteninsubunits (LMW-GS)of32-45kDa,arelinkedintopolymers thatrangein sizefromabout150kDatoover1,500kDa[2]Presentstudyrevealstheduetoitshigh contentofgliadin,gluteninandtotalproteinishigh in commercial available wheat flour proteinas compared to naturally refined wheat flour was investigated.Hence, it can be explored for baking products which effects the health of consumers. *E. coli* is commonly found in thelargeintestineofhumansandother warm-bloodedanimals.Thesestrainscanbecommensal,existinginasymbioticstateprov idingresistanceagainstpathogenicorganisms,orbepathogenicandcausediseases ofintestinalandextra-intestinal sites [5]Wheat protein from natural wheat flour was easily digested in the intestine by the *E.coli* cell whencomparedwithcommerciallyextractedwheatflourprotein.Toincreasethed emandofmarketvalueexcessamountof wheat protein was added to the wheat flour which was not easily digested by intestinal bacterial *E.coli*and alsocausing celiac disease. Furthermore investigation should be done to know the interaction between the gluten proteinwith the *E.coli*cells. It is better to use the gluten free cereal products and also naturally refined wheat flour toovercomeacute health issues.

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Fig:1Naturalrefinedwheatflourprotein

Fig:2Commerciallyavailablewheatflourprotein

Fig:3-PositiveNinhydrintest

Fig:4-Solubilitytest

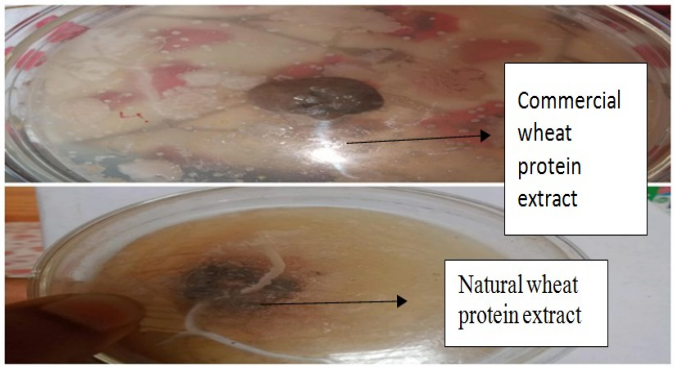

Fig:5a Biodegradationofcommercialwheatprotein

Fig:5b Naturalwheatproteinextract

Fig:6-AcrylonitrileButadiene-Styrenetest

A preliminary screening on biodegradability of face mask and their impact on plant growth of *Hibiscus sabdariffa, Andhra Pradesh, India*

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Abstract:

The outbreak of the COVID-19 pandemic led to a tremendous increase in the production of facemasks across the world. Face masks are for monitoring origins to avoid transmission from infected persons. The purpose of the facemask is like air filters that protect air born infectious pathogens. Filtering facemasks are either pharmacologically or non-pharmacologically used. There are many types of facemasks that are in use nowadays. They include surgical masks, N95, and cloth masks which have three-layered structures. The primary raw materials for the manufacturing of the surgical and N95 facemasks are non-biodegradable synthetic polymers made of polypropylene fibres. Disposal of these synthetic facemasks is increase solid waste load in the environment causing damage to natural flora and fauna. The present study aimed to analyse the biodegradability of two different kinds of face masks by using three different soil types to know the natural degradation of facemasks and also by the artificial pure microbial plate method. The degradation of 2 different face masks was not observed in both the mentioned methods during the study period from the Month of March 2022 to the end of August 2022. But a good sign in our identification that there is quick biodegradability when it was converted into

ash form. The time of biodegradability was about 1-2days/ 3gms of ash in both the natural and artificial methods. The use of reusable cloth masks is recommended to avoid soil pollution. The present study concluded that cloth masks have more potential degradation capability when compared with surgical masks within a short period of time. Further research should focus on assessing the soil profile status, and efficacy of cloth masks and surgical masks when dumped in the soil directly.The present literature review aims to evaluate these determinants and provide a framework for future interventions directed at increasing facemask usage as an effective public health measure to curb airborne infectious disease outbreaks.

Keywords: Covid-19, Face masks, Biodegradability, polymers, and Ash

Introduction:

Epidemiological investigations have helped quantify the benefit of mask-wearing to prevent the spread of COVID-19. Face masks are the ubiquitous symbol of a pandemic that has sickened 35 million people and killed more than 1 million. Wearing a mask can become uncomfortable, particularly for long periods in warm environments, and covering the nose and mouth may inhibit verbal and nonverbal communication.Various varieties of masks are in use by the public. Droplets can shoot through the air and land on a nearby person's eyes, nose, or mouth to cause infection. Aerosols, by contrast, can float in the air for minutes to hours, spreading through an unventilated room like cigarette smoke. As a great alternative, homemade fabric masks have become very popular in several affected countries, mainly in Brazil **[2].** Pharmaceutical and nonpharmaceutical measures against respiratory infections are available.Pharmaceuticals such as vaccines and antiviral medications are highly effective in eradicating respiratory infections, as evidenced in the case of smallpox. Aside from handwashing, the use of facemasks is also valuable in infectious disease control, especially in circumventing droplet transmission **[3]**. Increased usage of masks led to increased dumping of masks everywhere, littering our environment and polluting the soil. Moreover, the plastic fragments or microplastics derived from masks can further cause many other environmental problems. Microplastics (less than 5 mm) even nano-size plastic particles (less than 100 nm) are widely present in marine **[1]**, sediments **[8],** soil **[5], [9]**freshwater **[7], [6]** the atmosphere **[12]** and other environmental matrices **[6], [10], [11]**. The arrival of COVID-19 brought a wide range of masks made of different fabrics and materials into the market. Some of the most common masks used in India were cloth masks, N95 masks, surgical masks, FFP1 masks, and activated carbon masks. A cloth mask is made from several layers of tightly woven fabric and fits well over your nose and mouth to be an effective filter. In non-healthcare settings, multiple-layer fabric cloth masks are excellent barriers for containing respiratory droplets and interrupting viral transmission if they are worn consistently and properly, covering the nose and mouth. However, the explosive growth in the use of masks has introduced numerous issues related to the solid waste management

Material and Methods:

Processing of facemasks:

Both surgical and cloth masks were purchased from a nearby medical store. The elastic ear loop and nose bridge were first removed from the surgical mask and the rest of the mask was then cut into strips (1cm × 1cm) whereas cloth masks were directly made into small pieces (1cm x 1cm). The mask strips had an outer layer, middle layer, and inner layer which were submitted for biodegradation using natural and artificial methods.

Fig:1

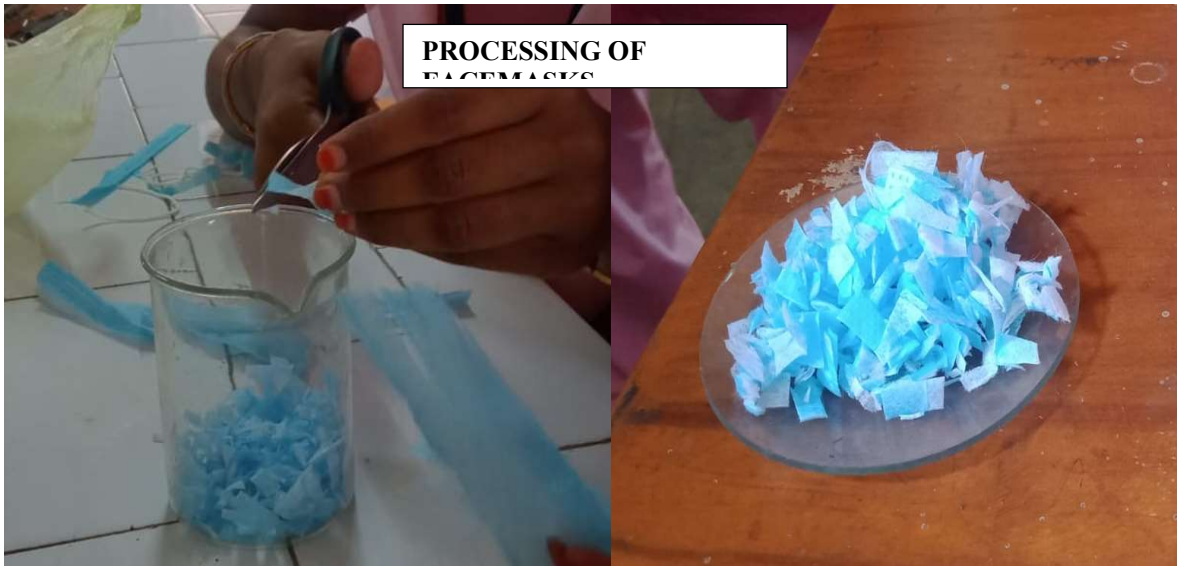

Fig-1: Processing of surgical Mask

Biodegradation by Natural method:

Three different soil types were taken into Petri plates from natural environment. Some pieces of surgical and cloth masks were placed in the Petri plates by using sterile forceps in the presence of three different types of soil samples (20 g) separately. The types of soil samples taken for the study were concrete sand, moisture red soil, and dry soil. **Fig:2**

Fig-2: Biodegradation of mask using 3 natural soil types

Biodegradation by Artificial pure microbial method:

Nutrient and potato dextrose broths were prepared separately under sterile condition. The microbial cultures used for this study were 2 bacterial *E. coli*, *Staphylococcusaureus,* and 2 fungal cells *Aspergillusniger* and *Trichoderma*. Each type of mask piece was placed into the Erlenmeyer flask containing microbial broths using sterile forceps and incubated for study on the artificial degradation of masks. The flasks were placed in a NEO- LAB incubator shaker (CAT: 051/263- NEO-LAB instruments Mumbai) with 300 rpm and 37 ℃ for 24 h. **Fig:3**

Fig-3: Biodegradation of mask using artificial microbial method

Conversion of mask into ash form:

Cloth masks were taken without making it into small pieces and submitted to direct incineration to convert them into ash form. The direct incineration of surgical masks and the indirect method of processing of surgical masks before incineration were performed. The processing of the surgical mask was done by soaking the mask in a bleaching solution for 3-4days. After this, the soaked mask material was carefully taken and dried. Finally, dried mask material was submitted for incineration. **Fig: 4,5&6**

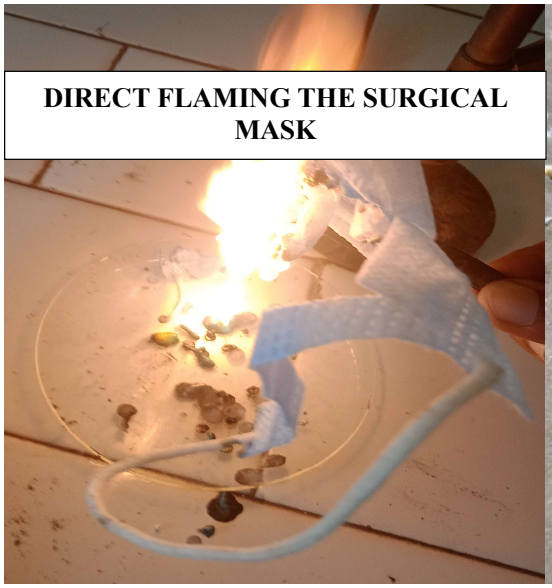

Fig-4: Direct Incineration of surgical mask

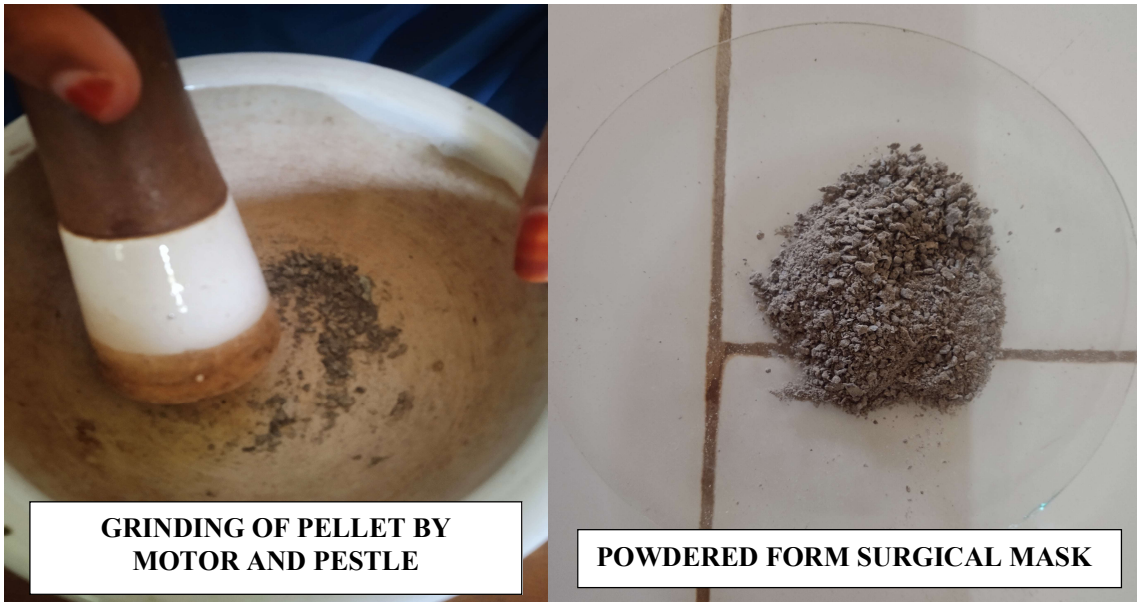

Fig-5: Grinding of surgical mask pellet to powder form

Fig-6: Processing the surgical mask to make into ash form

Effect of mask on plant growth:

Both mask pieces and ash form of two different kinds of masks were used to check their effect on plant growth. The leafy vegetable selected for this study was *Hibiscus sabdariffa.* Three different pots were taken, and soils in the first two pots were mixed with small mask pieces and ash form of the mask respectively along with a control pot without any mask products. The 6-8 seeds of *Hibiscus sabdariffa* were planted into the three pots and observed for their germination and measured the length of plants during the study period of 2weeks. **Fig:7**

MIXING MASK PIECES IN THE SOIL

GERMINATION OF SEED

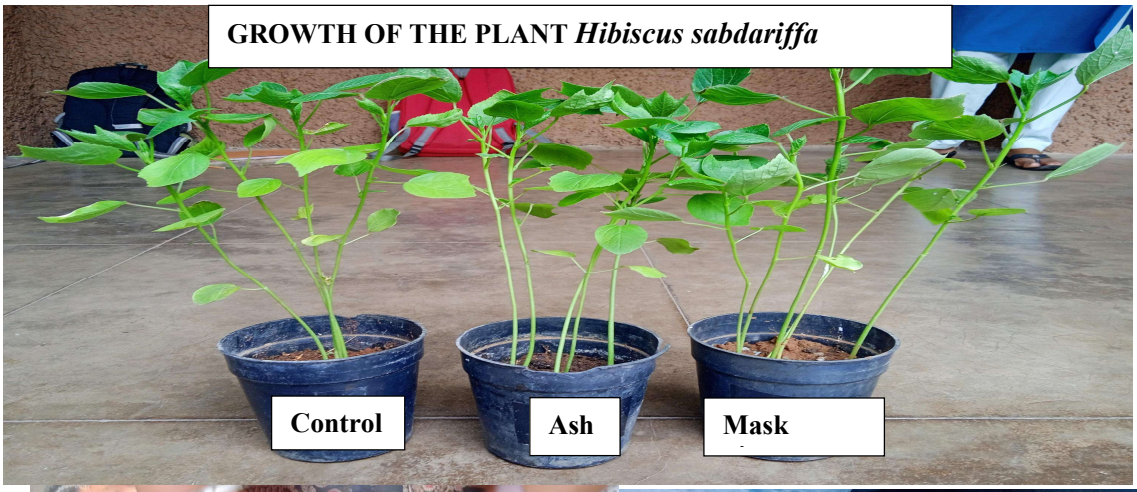

Fig:7: Effect of mask on plant growth of *Hibiscus sabdariffa*

Results:

Biodegradation of both the masks were not observed in both natural and artificial methods. The mask pieces remained as it is during the study period from March 2022 to August 2022. The processing of surgical masks in bleaching solution made the mask lose its polysynthetic nature where it got converted into ash form easily

when compared with the direct incineration of surgical masks. Direct incineration of the mask is also one of the good practices, but it won't lose its polysynthetic nature and can disrupt the soil flora and fauna. The effect of the mask pieces on the plant growth was observed where the growth was slow when compared with ash-mixed soil plant. The growth parameters are mentioned in **Table:1.**

S. No	SOIL TYPE	GROWTH RATE (cm)
1	Control soil	13cm
2	Soil with mask ash	15cm
3	Soil with mask pieces	5cm

The maximum plant growth rate was observed in ash-mixed soil of 15 cm where the minimum growth rate was 5cm during the study period. Pathogenic microorganisms present on the used mask will be killed up on processing the surgical mask in bleaching solution.

Discussion:

A surgical mask was used mainly after 1960 in different countries. These masks are prepared from nonwoven fabrics through the melt-blowing process. Surgical masks have three layers; the outer layer was made from nonwoven fabric.As a great alternative, homemade fabric masks have become very popular in several affected countries, mainly in Brazil **[2].** Through our research work, we found that the masks i.e. both synthetic and surgical masks could not be degraded either in soil or in artificial media in a period of 5 months. If small mask pieces are not remaining as it is without any degradation, then amount of time taken for a normal mask dumped in soil to get degraded becomes a matter of great concern. Direct dumping of masks could also pollute soil and thereby cause environmental pollution. Microplastics (less than 5 mm) even Nano-size plastic particles (less than 100 nm) are widely present in marine **[1]**, sediments **[8],** soil **[5], [9]** freshwater **[7], [6]** the atmosphere **[12]** and other environmental matrices **[6], [10], [11]**. The present study has suggested burning synthetic masks before their disposal is beneficial as it turns into Ash which is a good soil fertilizer for plants. But, masks should be processed in bleaching powder before incineration for better result. When these were crushed using mortar and pestle turned into a powder form. Natural cellulosic fibers like cotton mask has good degradation potentiality when compared with surgical masks. Processing the mask in bleaching solution will make the used surgical mask free from pathogenic microorganism that are present on it. Direct dumping of used masks may pollute the natural hygienic surrounding soil environment. So, It's better to process the used masks before their disposal into the soil. Further research should be done to know the interaction between mask material and soil microorganisms.

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Review on phytochemical secondary metabolites of five wild mushroom extracts and their Antimicrobial activity

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Abstract:

Wild mushrooms are a vital rich source ofnaturalnutrients and they are occasionally consumed for their supposed medicinal value. There are numerous reportson wild edible mushrooms, which doubt and confusion persist regarding which species are safe and suitable to consume. They are known as highly valued non-wood products today, thus wild mushrooms have played an important role in providing new sourcesof medicine in the whole World.. Our review highlights the need for further information on wild species in a clear. They can be used in the treatment of disease through their antimicrobial properties. Five different wild mushrooms were identified and collected from the campus of St. Ann's college for women, Malkapuram, Visakhapatnam. The result revealed that all mushroom extracts were having antimicrobial activity with high potential effectiveness in suppressing bacterial cell growth when compared with fungal cell growth. The maximum zone of inhibition was 1mm against on *E.coli* by Brown wild mushroom and minimum zone of inhibition was 0.1mm on *Staphylococcus aureus.* In the present study the presence of phytochemicals like flavonoids, alkaloidsand terpenoids were also analysed by using standard methods. The need for greater clarity on wild species of mushrooms is further underlined to know there nutritional values andphytochemical analysis with their molecular interactions.

Keywords: Wild Mushrooms, phytochemicals, Antimicrobial activity and medicinal values.

Introduction:

Mushroom is a general term utilized mostly for the macrofungal cell and mainly belongs to higher fungi. They have only a short reproductive stage in their life cycle with their nourishment source for human beings and animals. Fungi are eukaryotic, heterotrophic, and osmotrophic. They develop a rather diffuse, branched, tubular body (radiating hyphae making up mycelia or colonies), and reproduce by means of spores. Wild mushrooms are a popular food source. The high

humidity level during almost all season provides ideal atmospheric conditions for the mushrooms. The group includes mainly terrestrial species of diverse forms and habitat and is a general term used mainly for the fruiting bodies of macrofungal (Ascomycota and Basidiomycota) and represents only a short reproductive stage in their life cycle **[2].** They are untapped resources of nutrition and palatable food of the future. Due to high protein content they can be used to bridge the protein malnutrition gap. Edible mushrooms are sources of food and are cogitated as one of the delicious food all over the world. They have a high nutritional value almost twice that of any vegetable or fruit **[6].**As microbial resistance to antibiotics is becoming more and more prevalent, mushrooms are seen as a good source of new classes of compounds with antimicrobial activity, some of which, such as pleuromutilin, have led to the synthesis of new drugs that have been recently approved for use in humans**[5].**

Materials and methods

1. Extraction by Maceration

Five different wild mushroom were included in this study **(Fig 1)**identified and collected from campus of St. Ann's college for women, Malkapuram, Visakhapatnam. The collected mushrooms were watery washed, disinfected, rinsed with distilled water and finally dried. The dried mushrooms of each typewas homogenised into fine paste using mortar and pestle separately **(Fig 2)**. 50g of the fine paste was soaked in 200 ml of ethanol with stirring for 72h and then filtered through double layers of muslin, centrifuged at 9000 rpm for 10 min and finally filtered again through Whatman filter paper No.1 to attain a clear filtrate**(Fig 3)**. The extract yields were stored in a small bottles in fridge at 5^0C for future phytochemical and antimicrobial analysis.

Fig:1 Images of five wild mushroom from campus of St. Ann's college for women, Malkapuram, Visakhapatnam. 1. Brown 2. Yellow 3. White big 4. Orange and 5. Tiny white

Fig :2- Ethanol extraction by maceration

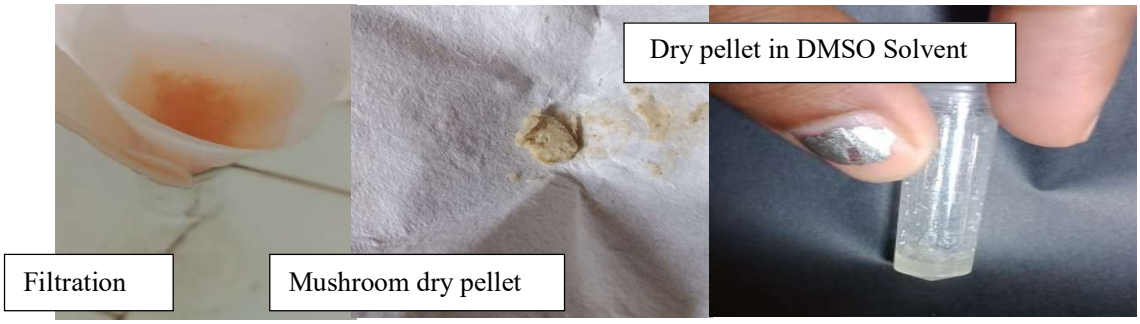

Fig:3 Processing the crude mushroom extract for analysis of Antimicrobial Activity

2. Antimicrobial activity of the Ethanol mushroom extracts :

2.1 Bacterial and fungal strains:

The antimicrobial potency of each extract was evaluated using three bacterial strains and two fungal strains. One strains of Gram positive *Staphylococcus aureus* and two strains of Gram negative *Escherichia coli* and *Klebsiella pneumoniae* bacteria.Two fungal strains used for antifungal activity was *Aspergillus niger* and *Trichoderma harizianum*.The bacterial and fungal strains were provided from the Microbialtype culture collection (MTCC), Chandigarh, India.

2.2. Inoculum preparation.

Each bacterial and fungal strains was sub-cultured overnight at 35^0C in Mueller-Hilton agar slants and PDA slants . The microbial growth was harvested using 5 ml of sterile broth kept overnight in orbital shaker at 37^0c for 24 hours. Separate bacterial and fungal lawn plates were prepared by inoculating fresh broth by usingspread plate technique on solidified Mueller-Hilton (Bacterial Media) and PDA agar plate (Fungal media).

2.3 Antibacterial Activity:

The well diffusion method is used to evaluate antibacterial activity of the each mushroom extract. The extract residues (50 mg) were then loaded in the well on lawn of bacterial culture plates**(Fig 4)** . The plates were kept in incubator at 37^0C for 24 h. The presence of inhibition zones were measured by usingHi-Media zone scale, recorded and considered as indication for antibacterial activity.

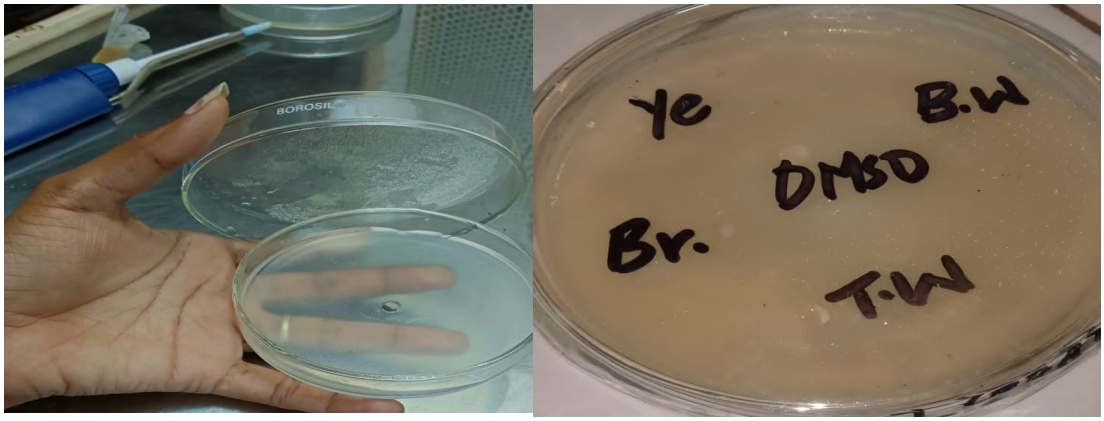

Fig:4- Loading the crude mushroom extract in the well on microbial lawn containing plate

2.3 Antifungal Activity:

The well diffusion method is used to evaluate antifungal activity of the each mushroom extract. The extract residues (50 mg) were then loaded in the well on lawn of fungal culture plates . The plates were kept in incubator at 27^0C for 24 h. The presence of inhibition zones were measured by using Hi-Media zone scale, recorded and considered as indication for antifungal activity.

3. Phytochemical Analysis:

3.1 Test for Flavonoids:

The stock solution (1 mL)of ethanol extract of mushroom was taken in a test tube and added few drop of dilute 2 % NaOH solution. An intense yellow colour was appeared in the test tube. It became colourless when on addition of a few drop of dilute acid.

3.2 Test for alkaloids:

One gram of mushroom dry pellet were taken in a conical flask and added 100ml distilled water and 20ml acetic acid. Hagar's reagent was added to the prepared crude solution and allow it for 8-10hours

3.3 Test for terpenoids :

The dry crude mushroom extract (5 mg) was dissolved in chloroform (2 mL) and then acetic anhydride (1 mL) was added to it. Concentrated sulphuric acid (1 mL) was added to the solution.

Results :

Antibacterial activity :

Five wild species of mushroom were investigated to evaluate their antibacterial activity against three bacterial strains. One strains of Gram positive *Staphylococcus aureus* and two strains of Gram negative *Escherichia coli* and *Klebsiella pneumoniae* bacteria. Evaluation of antibacterial activity of these extracts was recorded in **Table**

1 and illustrated in **Fig 5**. The results revealed that all mushroom extracts were potentially effective in suppressing microbial growth with variable potency. All mushroom extracts have effective in retarding microbial growth of all tested pathogenic bacteria. Big white mushroom extracts exhibited highest inhibitory effect against *Staphylococcus aureus,* Brownmushroom extracts exhibited highest inhibitory effect against *E.coli* and Tiny white and orange mushroom extracts exhibited highest inhibitory effect against *Klebsiella pneumoniae*

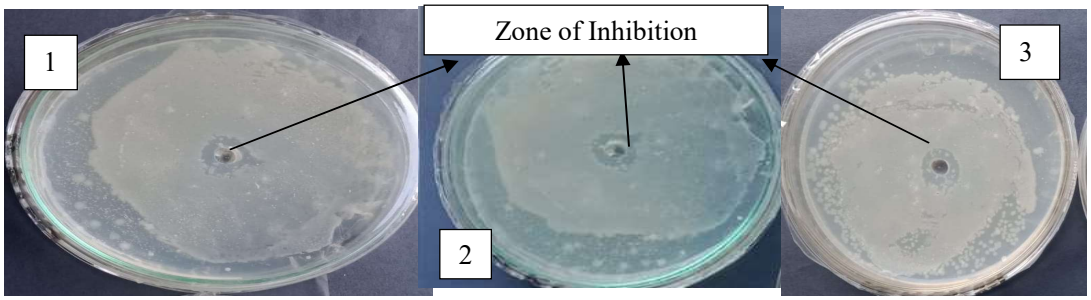

Fig:5- Maximum Zone of inhibition on bacterial cell 1.*Staphylococcus aureus, 2. E.coli*, 3. *Klebsiella pneumoniae*

Table:1- Zone of inhibitions (mm) of five mushroom extracts on three bacterial cells

S.No	Name of the Wild Mushroom	*S. aureus*	*E.coli*	*K. pneumoniae*
1	Brown	0.1mm	1mm	0.5mm
2	Yellow	0.5mm	0.1mm	0.2mm
3	White	0.8mm	0.2mm	0.5mm
4	Orange	0.5mm	0.2mm	1mm
5	Tiny White	0.1mm	0.5mm	1mm

Antifungal activity:

Five wild species of mushroom were investigated to evaluate their antifungal activity against two fungal strains *Aspergillus niger* and *Trichoderma harizianum.* The mushroom extracts have very less potential activity on fungal cell.Big white mushroom extracts exhibited highest inhibitory effect against *Aspergillus niger*and orange and yellow mushroomextracts exhibited highest inhibitory effect against *Trichoderma harizianum.*Results of antimicrobial activity of the five mushroom extracts can suggested that *E.coli* was the most resistant strain to mushroom extracts followed by *S. aureus* and *K. pneumonia*. Moreover, Big white, orange and brown extracts were the most effective extracts and showed a strong antibacterial activity. Very less potential effect on fungal cell when compared with bacterial cell**(Fig:6, Table:2)**

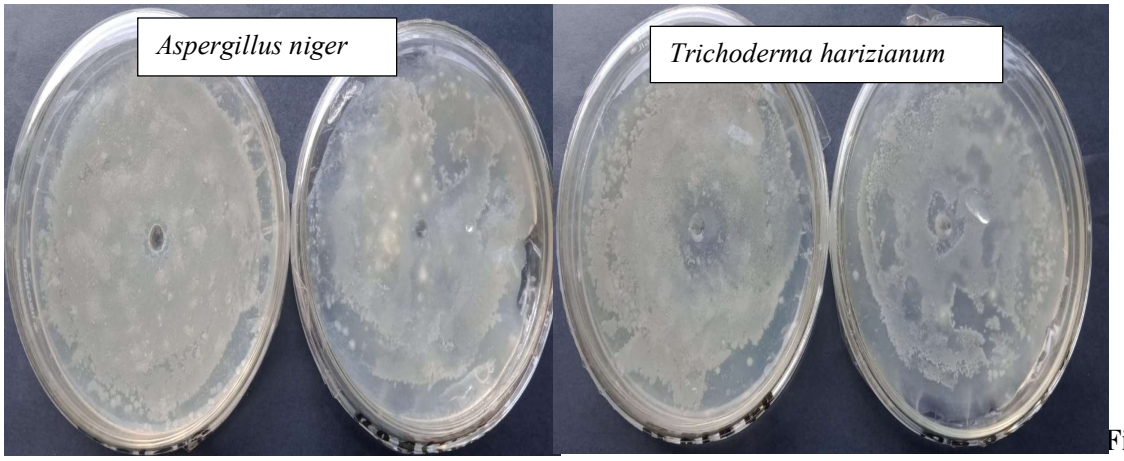

Fig:6- Antifungal activity of mushroom extracts

Table:2- Zone of inhibitions (mm) of five mushroom extracts on two fungal cells

S.No	Name of the Wild Mushroom	*Aspergillus niger*	*Trichoderma harizianum*
1	Brown	0.2mm	0.3mm
2	Yellow	0.1mm	0.2mm
3	White	0.3mm	0.1mm
4	Orange	0.0mm	0.2mm
5	Tiny White	0.0mm	0.1mm

Phytochemical Analysis

Disappearance of formedcolourwhen treated few drop of dilute acid indicates the presence of flavonoids in the Orange, brown, big white and yellow. Where there is no colour formation in tiny white and small white indicate the absence of flavonoids. Precipitate crystals were formed after the incubation period along with Hagar's reagent revealed the presence of alkaloid in five wild mushroom extracts.The result for phytochemical screening of ethanol extracts were showed the presence of flavonoids,alkaloids in five different wild mushroom extracts but terpenoids not present in the crude extract (**Fig:7, Table:3**).

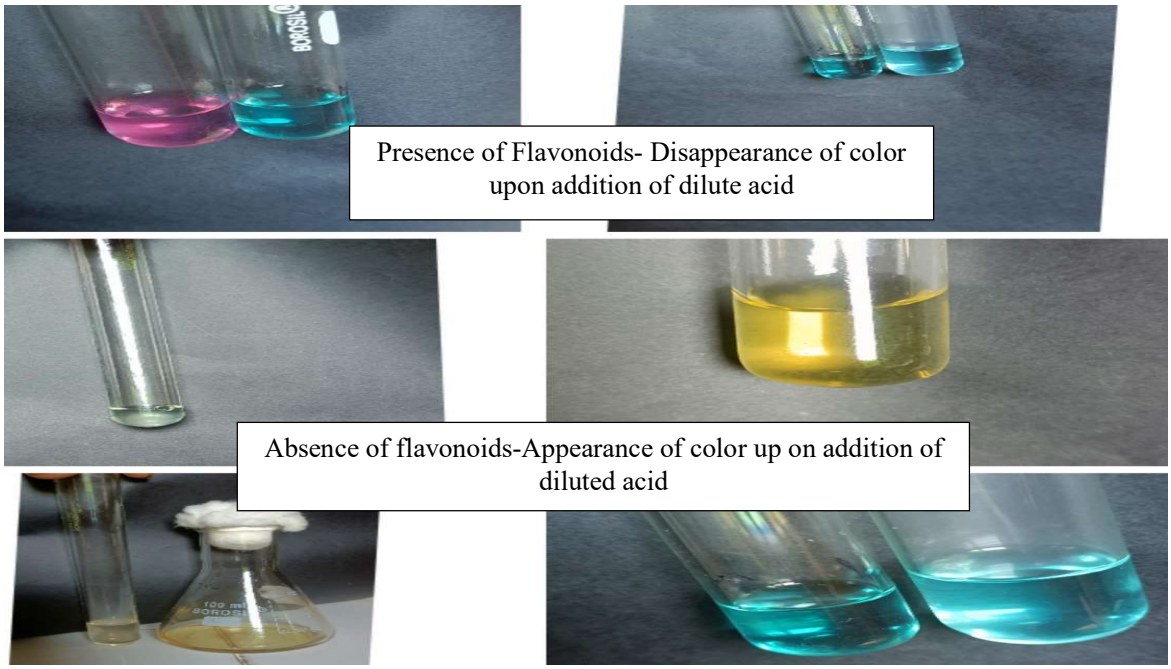

Fig:7- Phytochemical analysis- Test for Flavonoids

Table:3- Summary of Phytochemical analysis (secondary metabolites) in wild mushrooms extracts

S.No	Name of the Wild Mushroom	Flavonoids	Alkaloids	Terpenoids
1	Brown	Present	Present	Absent
2	Yellow	Present	Absent	Absent
3	White	Present	Present	Absent
4	Orange	Present	Present	Absent
5	Tiny White	Absent	Present	Absent

Discussion:

The chemical constituents in the mushroom extracts are known to be biologically active ingredients. Some chemical constituents are considered as secondary metabolites components. They are directly responsible for different activity such as antioxidant, antimicrobial, antifungal and anticancer**[3].**Therefore, the detected different bioactive compounds is very essential to know their antimicrobial activity. Several authors already reported on flavonoids groups exhibited a wide range of biological activities such as antioxidant, anti-inflammatory, antimicrobial, antiangionic, anticancer and anti-allergic**[1,4].** Medicinal plants are the best sources for chemical ingredients, antimicrobial and antioxidant agents for cure of different diseases. Here we can also consider mushroom extracts for their potential effective parameters against microbial cells. These crude extracts could be used as antibiotics or different aliments in pharmaceutical fields. The present study suggested that the extracts which proved to be potentially effective can be used as natural preservatives to

control health hazards. These t extracts considered as natural sources of antimicrobial agents, regarded as nutritionally safe and easily degradable .The collected wild edible mushrooms are nutritious and therapeutic. Therefore, wild edible mushroom can be a source of nutritional components of food such as protein, carbohydrate, fats, inorganic compounds and essential vitamins. Hence terms like mushroom nutraceuticals, dietary supplements have emerged.Due to deforestation and urbanization, existence of different groups of the organisms including mushrooms are threatened and has resulted in the loss of traditional knowledge about their uses which is acquired over hundreds years of experience and understanding of environment. In this regard, ethnomycological survey to be conducted future.As microbial resistance to antibiotics is becoming more and more prevalent, mushrooms are seen as a good source of new classes of compounds with antimicrobial activity, some of which, such as pleuromutilin, have led to the synthesis of new drugs that have been recently approved for use in humans**[5]**

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